

BACKGROUND OF THE INVENTION

Field of the Invention

The present invention relates to a printer and a printing system, and more particularly to a printer and a printing system suitable for printing a printing job having some secret.

Description of the Related Art

These days, a printing system in which a printer is shared by means of a network has been increasingly used. Namely, by connecting a plurality of computers as clients to one network and connecting, for example, one printer to this network, one printer can receive printing jobs from the plurality of clients and perform printing.

In the printing system using this network, there is a certain distance between the clients and the printer in some cases, and hence a function of confidential printing is supported providing against a case where a printing job with some secret which others are not permitted to look at is printed.

In this confidential printing, when a user transmits a printing job from the client to the printer, for example, confidential attribute information indicating confidential printing, user information and a password are added thereto. The printer which has received this printing job does not immediately start printing based on this printing job, but temporarily saves it as printing job data in a hard disk. When the user comes to the printer and inputs right user information and password from an operation panel of the printer, the printer reads the printing job data out of the hard disk and starts printing. This prevents the printing result of the printing job to be seen by others before the user which has transmitted the printing job arrives at the printer.

In printers supporting such a function of confidential printing, there is a printer which can be set to still hold the printing job in the hard disk after printing. Namely, there is a printer which can be set to save the printing job in the hard

disk so that even the printing job which has been printed can be printed again at the request of the user. After a lapse of a given period of time or when a given amount of printing jobs are held, the printing jobs are deleted in sequence from the hard disk.

When the aforesaid confidential printing is performed by the printer having such a hold function, even a printing job of secret confidential printing is held as printing job data in the hard disk after printing is completed. In this case, it can not be said that there is no possibility that a third person with dishonest intentions looks surreptitiously at the printing job data, which has been already printed but still held in the hard disk, forcibly by some means.

SUMMARY OF THE INVENTION

The present invention is made in view of the aforesaid problem, and an object of the present invention is to provide a printer and a printing system which do not hold a printing job having some secret in an auxiliary memory device such as a hard disk or the like even when, in the case of a printer with the function of holding a printing job after printing, the printer itself is set to hold the printing job after printing.

In order to accomplish the aforementioned and other objects, according to one aspect of the present invention, a printer, comprising:

a set portion in which whether or not a received printing job is held as printing job data in an auxiliary memory device even after printing of the received printing job is completed is set not for each printing job but comprehensively, this comprehensive setting being allowed to be performed from a client via a network;

a judging portion which judges whether the received printing job is set to have some secret or not; and

a selective holder which refrains from holding the printing job as printing job data in the auxiliary memory device even if the set portion is set so that the printing job is still held as printing job

some secret or not;

refraining from holding the printing job as printing job data in the auxiliary memory device even if the set portion is set so that the printing job is still held as printing job data in the auxiliary memory device even after printing is completed when it is judged that the printing job is set to have some secret in the step of judging; and

holding the printing job as printing job data in the auxiliary memory device when it is judged that the printing job is not set to have some secret in the step of judging and the set portion is set so that the printing job is still held as printing job data in the auxiliary memory device even after printing is completed.

According to a still further aspect of the present invention, a record medium on which a program is recorded, the program causing the printer to execute the steps of:

performing comprehensive setting for a set portion from a client via a network, whether or not a received printing job is held as printing job data in an auxiliary memory device even after printing of the received printing job is completed being set not for each printing job but comprehensively in the set portion;

judging whether the received printing job is set to have some secret or not;

refraining from holding the printing job as printing job data in the auxiliary memory device even if the set portion is set so that the printing job is still held as printing job data in the auxiliary memory device even after printing is completed when it is judged that the printing job is set to have some secret in the step of judging; and

holding the printing job as printing job data in the auxiliary memory device when it is judged that the printing job is not set to have some secret in the step of judging and the set portion is set so that the printing job is held as printing job data in the auxiliary memory device even after printing is completed.

According to a still further aspect of the present invention, a printing system in which a plurality of clients and at least one printer are connected via a network,

wherein the client comprises a transmitter which sets a printing job to have some secret and transmits the printing job to the printer via the network, and

wherein the printer comprises:

5 a set portion in which whether or not a received printing job is held as printing job data in an auxiliary memory device even after printing of the received printing job is completed is set not for each printing job but comprehensively, this comprehensive setting being allowed to be performed from the client
10 via the network;

a judging portion which judges whether the received printing job is set to have some secret or not; and

a selective holder which

refrains from holding the printing job as printing
15 job data in the auxiliary memory device even if the set portion is set so that the printing job is still held as printing job data in the auxiliary memory device even after printing is completed when the judging portion judges that the printing job is set to have some secret, and

20 holds the printing job as printing job data in the auxiliary memory device when the judging portion judges that the printing job is not set to have some secret and the set portion is set so that the printing job is still held as printing job data in the auxiliary memory device even after printing is
25 completed.

According to a still further aspect of the present invention, a method for controlling a printing system in which a plurality of clients and at least one printer are connected via a network, comprising the steps of:

30 performing comprehensive setting for a set portion from the client via the network, whether or not a received printing job is held as printing job data in an auxiliary memory device even after printing of the received printing job is completed is set not for each printing job but comprehensively in the set
35 portion;

setting the printing job to have some secret and transmitting the printing job from one of the clients to the printer via the

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of the present invention;

Fig. 8 is a block diagram explaining processing when confidential printing is performed in the printing system according to the second embodiment of the present invention;

5 Fig. 9 is a diagram showing an example of a data structure of a printing job to be transmitted from a client to a printer in the printing system according to the second embodiment of the present invention;

10 Fig. 10 is a flowchart explaining processing when the printer in the second embodiment of the present invention prints a printing job stored in a hard disk (which corresponds to Fig. 4);

Fig. 11 is a timing chart when a hold function of each printer of the first embodiment and the second embodiment of the present invention is set from the client (a third embodiment); and

15 Fig. 12 is a timing chart when confidential printing of each printer of the first embodiment and the second embodiment of the present invention is set for each connection (the third embodiment).

20 DESCRIPTION OF THE PREFERRED EMBODIMENTS

[First embodiment]

When receiving a printing job of confidential printing, a printer according to the first embodiment of the present invention is designed not to hold this printing job in a hard disk even
25 when the printer is set to hold data on the printing job in the hard disk after printing is completed. This will be explained below in more detail.

First, the configuration of a printing system according to this embodiment will be explained based on Fig. 1. Fig. 1 is
30 a block diagram showing a hardware configuration of the printing system according to this embodiment.

As shown in Fig. 1, the printing system according to this embodiment comprises a plurality of clients 20, 20, and 20 connected to a network 10 and one printer 30 also connected to the network
35 10. The client 20 is any one of various computers called a host computer, a personal computer, and the like, and in this embodiment it is a computer especially to generate a printing job and transmit

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this printing job to the printer 30 via the network 10.

In this embodiment, the printer 30 is a so-called network printer and comprises a CPU (Central Processing Unit) 31a, a RAM (Random Access Memory) 31b, a ROM (Read Only Memory) 31c, and a hard disk 32.

In this printer 30, the printing job received from the network 10 is temporarily stored as printing job data in the hard disk 32. This hard disk 32 is contained in the printer 30 in this embodiment, but it may be attached to the outside of the printer 30 or provided separately via the network 10. The hard disk 32 composes an auxiliary memory device in this embodiment.

The printer 30 which has received the printing job which is not confidential printing generates a printing request from printing job data to perform printing according to the state of use of a printer engine provided in the printer 30. Namely, the printer 30 reads the printing job data stored in the hard disk 32 in sequence and generates the printing request based on this printing job data. When the printer engine is not in use, the printer 30 transmits the printing request to the printer engine to perform printing.

Meanwhile, the printer 30 which has received the printing job which is confidential printing saves its printing job data in the hard disk 32 until a user inputs user information and a password to the printer 30. This state is called a pending state in this embodiment. When the user inputs the user information and the password to the printer 30 in this pending state, the printer 30 reads the printing job data stored in the hard disk 32 and generates a printing request based on this printing job data. When the printer engine is not in use, the printer 30 transmits the printing request to the printer engine to perform printing.

The aforesaid successive processing from the reception of the printing job till the performance of printing is realized by the execution of various programs by the CPU 31a. During this successive processing, the CPU 31a accesses the RAM 31b, the ROM 31c, or the hard disk 32 as necessary. This CPU 31a composes an arithmetic processing unit in this embodiment.

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Next, concrete processing when printing is performed in the printing system according to this embodiment will be explained in detail.

Fig. 2 is a block diagram explaining confidential printing processing in the printing system according to this embodiment. As shown in Fig. 2, first of all, (1) the client 20 generates a printing job of confidential printing based on an input instruction from the user. Fig. 3 is a diagram showing a data structure of the printing job of confidential printing according to this embodiment. As shown in Fig. 3, the printing job of confidential printing includes at least printing data D1, confidential attribute information D2, user information D3, and a password D4.

Actual data necessary to cause the printer 30 to drive the printer engine to print it on printing paper are stored in the printing data D1. Information indicating whether the printing job is confidential printing or not is stored in the confidential attribute information D2. Information to identify the user who has made this printing job is stored in the user information D3. In this embodiment, a user ID (ABC123456, for example) is used as the information to identify the user. A password (1234567890XYZ, for example) to be inputted to the printer 30 when the user performs confidential printing is stored in the password D4. This password D4 may be inputted to the client 20 by the user for each printing job, or if it may be registered as the user's own password with the client 20 and it need not be inputted for each printing job.

In this embodiment, attribute information on the printing data D1 is composed of the confidential attribute information D2, the user information D3, and the password D4. Incidentally, when confidential printing is not performed, the user information D3 and the password D4 are not always required. Moreover, the confidential attribute information D2 may be added to the printing data D1 only when confidential printing is performed. In this case, it is possible to omit the confidential attribute information D2, the user information D3, and the password D4 when the printing job is not confidential printing.

Then, as shown in Fig. 2, the client 20 which has generated

the printing job of confidential printing (2) transmits this printing job to the printer 30 via the network 10. The printer 30 which has received this printing job (3) stores this printing job as printing job data in the hard disk 32.

5 The printer 30 then reads the printing job data stored in the hard disk 32 in proper timing and executes printing processing. Fig. 4 and Fig. 5 are flowcharts explaining the printing processing executed by the printer 30. This printing processing is realized by the execution of printing processing programs stored in the
10 ROM 31c and/or the hard disk 32 by the CPU 31a.

As shown in Fig. 4 and Fig. 2, in predetermined timing, the printer 30 (4) reads the printing job data stored in the hard disk 32 (step S10).

Subsequently, as shown in Fig. 4, the printer 30 extracts
15 and reads attribute information from the read printing job data (step S11). Then, it saves this attribute information in association with the printing job data (step S12). In this embodiment, the attribute information is saved in the RAM 31b provided in the printer 30. The attribute information is
20 previously stored in the RAM 31b in order to eliminate the necessity of reading the printing job data stored in the hard disk 32 in each subsequent processing (for example, step S13 or step S20 described later).

Thereafter, the printer 30 judges whether the printing job
25 is confidential printing or not (step S13). When it is not confidential printing (step S13: No), the procedure jumps to printing processing in step S16 described later. In the case of confidential printing (step S13: Yes), the printer 30 judges whether user information and a password are inputted from the
30 user regarding this printing job (step S14). When the user information and the password are not inputted (step S14: No), the printer 30 stands by while repeating processing in step S14.

As shown in Fig. 2, in this embodiment, in step S14, the user information and the password are inputted by the user (5-A)
35 from an operation panel 34 provided in the printer 30 or (5-B) from the client 20. Fig. 6 is a diagram showing an example of the operation panel 34 according to this embodiment. As shown

in Fig. 6, the user operates input keys 36 displayed on the operation panel 34 provided in the printer 30 to input the user information and the password to an input field 38.

On the other hand, when these user information and password are inputted from the client 20, the user inputs these user information and password from an input unit of the client 20 and transmits them to the printer 30 via the network 10.

Incidentally, in both the cases, if the user inputs the password after specifying a printing job, it is possible to omit the input of the user information since the printing job includes the user information.

Next, as shown in Fig. 2 and Fig. 4, when the user information and the password are inputted (step S14: Yes), (6) the printer judges whether these inputted user information and password coincide with the user information D3 and the password D4 included in the printing job (step S15).

As shown in Fig. 4, when the inputted user information and password do not coincide with the user information D3 and the password D4 included in the printing job (step S15: No), the printer returns to the aforesaid step S14 and stands by.

When they coincide (step S15: Yes) and when it is judged that the printing job is not confidential printing in the aforesaid step S13 (step S13: No), (7) actual printing processing is performed (step S16) also as shown in Fig. 2. More specifically, the printer 30 performs language interpretation based on the printing data D1 in the printing job to generate a printing request, and then transmits this generated printing request to the printer engine when the printer engine is not in use to print printing paper.

Thereafter, as shown in Fig. 5, the printer 30 checks setting information on this printer itself (step S17). Based on this setting information, the printer 30 judges whether the printer 30 is set to hold the printing job in the hard disk 32 after printing (step S18). Namely, the printer 30 according to this embodiment can be set to still hold or not to hold the printing job data in the hard disk 32 after printing, not for each printing job but comprehensively.

When being set to hold the printing job in the hard disk

32 after printing (step S18: Yes), the printer checks attribute information on the printing job (step S19) and judges whether the printing job is confidential printing or not (step S20). When it is not confidential printing (step S20: No), the printing job data are not deleted from the hard disk 32 (step S21) at this point. Specifically, the status of the printing job data stored in the hard disk 32 is changed from the pending state in which printing is not started to a holding state in which printing is completed. Then, the printing processing is completed.

Meanwhile, when the printer judges that the printing job is confidential printing (step S20: Yes) and when it judges that the printer is not set to hold the printing job after printing in the aforesaid step S18 (step S18:No), (8) the printing job data stored in the hard disk 32 are deleted (step S22) as shown in Fig. 2. Then, the printing processing is completed.

As described above, according to the printing system in this embodiment, in the case of confidential printing which is a kind of printing of secret documents, even if the printer 30 is set to hold printing job data after printing, the printing job data are deleted without being held in the hard disk 32 after printing, whereby the secrecy of confidential printing can be heightened. Namely, the occurrence of a possibility that when the printer 30 is set to hold the printing job data in the hard disk 32 after printing as in related arts, the printing job data is still held in the hard disk 32 and as a result some dishonest person looks surreptitiously at the contents held in the hard disk 32 can be avoided.

Moreover, by only changing the status of the printing job data stored in the hard disk 32 from the pending state to the holding state, the processing to hold the printing job data in the hard disk 32 after printing can be performed, whereby its processing time can be reduced to the shortest possible time.

[Second embodiment]

In the second embodiment of the present invention, a directory server 40 which manages user information and passwords all over the network is provided in the aforesaid first embodiment, and when the user inputs user information and a password to the

In this embodiment, attribute information on the printing data D1 is composed of the confidential attribute information D2 and the user information D3. Incidentally, when confidential

Then, as shown in Fig. 8, the client 20 which has generated the printing job of confidential printing (2) transmits this printing job to the printer 30 via the network 10. The printer 30 which has received this printing job (3) stores this printing job as printing job data in the hard disk 32.

In the explanation of only points different from the aforesaid first embodiment, when user information and a password are inputted in step S14 (step S14: Yes), the printer 30 transmits the inputted user information and password to the directory server 40 (step S30). Incidentally, when the input of user information is omitted, the printer 30 transmits user information included in the printing job and a password inputted at this point by the user to the directory server 40 via the network 10.

As shown in Fig. 8, (6) the directory server 40 which has received these user information and password judges whether user
35 information registered in advance in a user table provided in this directory server 40 and a password registered corresponding to this user information coincide with the user information and

the password received this time. When they coincide, the directory server 40 transmits a collation result indicating that they coincide to the printer 30, and when they do not coincide, it transmits a collation result indicating that they do not coincide to the printer 30.

As shown in Fig. 10, the printer 30 receives this collation result via the network 10 (step S31). Then, it judges whether the collation result indicates that the user information and the password inputted by the user coincide with the user information registered with the directory server 40 and the password registered corresponding to this user information (step S32).

When the collation result indicates that they do not coincide (step S32: No), the printer 30 returns to the aforesaid step S14 and stands by until user information and a password are inputted again. Meanwhile, when the collation result indicates that they coincide (step S32: Yes) and when it is judged that the printing job is not confidential printing in the aforesaid step S13 (step S13: No), (7) actual printing processing is performed (step S16) as shown in Fig. 8.

Processing after this is the same as that in the aforesaid first embodiment, and hence the detailed explanation thereof is omitted here.

As described above, according to the printing system related to this embodiment, in the case of confidential printing which is a kind of printing of secret documents, even if the printer 30 is set to hold printing job data after printing, the printing job data are deleted without being held in the hard disk 32 after printing, whereby the secrecy of confidential printing can be heightened. Namely, the occurrence of a possibility that when the printer 30 is set to hold the printing job data in the hard disk 32 after printing as in the related arts, the printing job data is still held in the hard disk 32 and as a result some dishonest person looks surreptitiously at the contents held in the hard disk 32 can be avoided.

[Third embodiment]

Next, a method of performing the comprehensive setting of a hold function and the setting of confidential printing of the

printer 30 according to the aforesaid first embodiment and second embodiment from the client 20 will be explained as the third embodiment.

As stated above, the printer 30 according to the first
 5 embodiment and the second embodiment can be set to hold or not to hold the printing job data in the hard disk 32 after printing, not for each printing job but comprehensively. This setting of the hold function is stored in the RAM 31b provided in the printer 30.

10 This setting of the hold function can be performed by the user from the operation panel 34 shown in Fig. 2. Specifically, the user can comprehensively set whether the printing job data is held or not after printing by operating the operation panel 34. Namely, whether the printing job data is held in the hard
 15 disk 32 or not can be set as the setting of the hold function of the printer 30 itself.

This setting of the hold function can be performed also from the client 20. Fig. 11 is a timing chart showing the transmission and reception of signals between the client 20 and
 20 the printer 30 when the hold function is set from one of the clients 20. Shown in this case is the timing chart when the user operates the client 20 to set the hold function of holding the printing job data after printing, and thereafter to cancel the setting of the hold function.

25 First, the user operates the client 20 and instructs it to set the printer 30 to hold the printing job data after printing. The client 20 which has received this instruction (1) inquires of the printer 30 whether the printer 30 has the hold function of holding the printing job data after printing via the network
 30 10. The printer 30 which has received this inquiry replies whether it has the hold function or not. Since the printer 30 has the hold function in the example in Fig. 11, (2) it transmits a replay to the effect that it has the hold function to the client 20.

The client 20 which has received the replay to the effect
 35 that the printer has the hold function (3) transmits a hold setting request to the printer 30 so that the printing job data are comprehensively held in the hard disk 32 after printing. In the

30, and hence the user need not set confidential printing for each of printing jobs. Consequently, more convenience can be given to the user.

It should be noted that the present invention is not limited to the aforesaid embodiments and can be modified variously. For example, although whether a printing job has some secret or not is judged by the printer 30 by confirming whether the printing job is a confidential printing or not in the aforesaid embodiments, it may be judged by using other viewpoints. For example, in the case of a printing job in which printing is started only when a right password is inputted from the user when the printer 30 receives the printing job, it may be suitable to judge that this printing job has some secret.

The printer 30 according to the aforesaid embodiments has the function of selectively setting whether to hold or not to hold the printing job in the hard disk 32 after printing, but this selective setting function is not always necessary. Namely, the present invention can be applied also to the printer 30 which does not have such a selective setting function and holds the printing job in the hard disk after printing as the printer's own non-selective function.

Further, although the received printing job is temporarily stored as printing job data in the hard disk 32 before printing in the aforesaid embodiments, the printing job data need not be always stored in the hard disk 32 before printing. In this case, it is recommended that when the printing job which is not confidential printing is received, printing be performed with the printer engine driven, and that when the printing job which is confidential printing is received, the printing job be stored as printing job data in a memory or be stored as printing job data in the hard disk 32 only in this case.

As for each processing explained in each of the aforesaid embodiments, it is possible to record a program to execute each processing on a record medium such as a floppy disk, a CD-ROM (Compact Disc-Read Only Memory), a ROM, a memory card, or the like and distribute this program in the form of the record medium. In this case, the aforesaid embodiments can be realized by making

the client 20, the printer 30, and/or the directory server 40 read the record medium on which this program is recorded and execute this program.

5 The client 20, the printer 30, and/or the directory server 40 sometimes has other programs such as an operating system, other application programs, and the like. In this case, by using these other programs, such a command as calls a program to realize processing equal to that in the aforesaid embodiments out of programs in the printer 30 may be recorded on the record medium.

10 Further, such a program can be distributed not in the form of the record medium but in the form of a carrier wave via a public network. The program transmitted in the form of the carrier wave over the public network is incorporated in the client 20, the printer 30, and/or the directory server 40 as required, and the
15 aforesaid embodiments can be realized by executing this program.

Furthermore, when being recorded on the record medium or transmitted as the carrier wave over the public network, the program is sometimes encoded or compressed. In this case, the client 20, the printer 30, and/or the directory server 40 which has read
20 the program out of the record medium or the carrier wave needs to execute the program after decoding or expanding it.

As explained above, according to the printer related to the aforesaid embodiments, even in the case of a printer having the function of holding printing jobs in an auxiliary memory device
25 after printing, a printing job having some secret is not held in the auxiliary memory device after printing, whereby the secrecy of the printing job can be heightened.